IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Examiner	:	Thomas S. Bomar	
Title	:	Apparatus for Changing Wellbore Fluid Temperature	
Docket No.	:	1391-46000	
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Commissioner for Patents
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REPLY TO FINAL OFFICE ACTION DATED MARCH 15, 2006

Sir:

Please amend the above-identified application as follows.

Amendments to the Claims are reflected in the listing of the claims that begins on page 2 of this paper.

Remarks begin on page 13 of this paper.

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (previously presented) A flowbore fluid temperature control system comprising:

a control system body comprising a flowbore extending through the length of the control system body;

a valve mechanism within the control system body that controls the flow of flowbore fluid through the flowbore while maintaining the flowbore fluid in the control system body flowbore;

an actuator that adjusts the valve mechanism;

an operating system that operates the actuator and controls the flowbore fluid pressure; and

the temperature of the flowbore fluid being controlled by controlling the pressure drop of the flowbore fluid across the valve mechanism.

2. (original) The flowbore fluid temperature control system of claim 1 where the valve mechanism comprises a multi-position sleeve valve.

3. (previously presented) The flowbore fluid temperature control system of claim 1 where the valve mechanism comprises:

a valve sleeve within the flowbore forming an annulus between the outside of the valve sleeve and the inside of the control system body;

the valve sleeve comprising flow ports allowing fluid flow through the valve sleeve and into the annulus; and

a piston slidingly engaging the inside of the valve sleeve, the position of the piston within the valve sleeve controlling the fluid flow through the flow ports.

4. (original) The flowbore fluid temperature control system of claim 3 further comprising a seal preventing fluid flow across the seal between the outside of the piston and the inside of the valve sleeve.

5. (original) The flowbore fluid temperature control system of claim 3 where the valve sleeve further comprises an outer threaded portion that threadingly engages an inner threaded portion of the flowbore.

6. (original) The flowbore fluid temperature control system of claim 3 where the actuator further comprises a spring within the valve sleeve that interacts with the piston.

7. (original) The flowbore fluid temperature control system of claim 3 where the piston moves in a first direction with an increase in flowbore fluid pressure such that the force of the flowbore fluid pressure causes the piston to compress a spring.

8. (previously presented) The flowbore fluid temperature control system of claim 3 where:

the inside of the valve sleeve further comprises a circumferential groove that reciprocates between multiple first and second positions;

the piston further comprises a ratchet lug extending from the piston that travels within the groove;

the piston moves axially under a first load until the ratchet lug moves to one of the second positions, the ratchet lug rotating the piston as the ratchet lug travels to one of the second positions;

the piston moves axially under a second load until the ratchet lug moves to one of the first positions, the ratchet lug rotating the piston as the ratchet lug travels to one of the first positions;

the piston selectively moves between the first and second positions as the piston rotates within the valve sleeve; and

the position of the piston in the first and second positions allowing varying flow rates through the valve sleeve.

9. (original) The flowbore fluid temperature control system of claim 8 where flowbore fluid pressure provides the first load.

10. (previously presented) The flowbore fluid temperature control system of claim 8 where a spring that is compressed as the piston moves to the second positions provides the second load.

11. (previously presented) The flowbore fluid temperature control system of claim 8 where, once the piston is in one of the second positions, the valve mechanism maintains a selected fluid flow rate with an increase in the flowbore fluid pressure.

12. (original) The flowbore fluid temperature control system of claim 8 where a lock ring locks the piston in a selected second position.

13. (original) The flowbore fluid temperature control system of claim 1 where the operating system further comprises a fluid pump that controls the fluid pressure within the flowbore.

14. (original) The flowbore fluid temperature control system of claim 1 where the operating system operates the actuator mechanism to position the valve mechanism and selectively control the amount of fluid flow through the valve mechanism.

15. (original) The flowbore fluid temperature control system of claim 1 where the valve mechanism is selected from the group consisting of a poppet valve, an orifice, a reduced-diameter flow path, and a tortuous flow path.

16. (original) The flowbore fluid temperature control system of claim 1 where the valve mechanism comprises a single-position device adapted to create a flow restriction.

17. (original) The flowbore fluid temperature control system of claim 16 where the single-position device comprises a flow restrictor placed in the fluid flowbore selected from the group consisting of a ball, sleeve, and a bar.

18. (original) The flowbore fluid temperature control system of claim 1 where the actuator is selected from the group consisting of a mechanical actuator, an electrical actuator, and a hydraulic actuator.

19. (original) The flowbore fluid temperature control system of claim 1 were the operating system is selected from the group consisting of a mechanical system, a hydraulic system, an electrical system, and an acoustic system.

20. (original) The flowbore fluid temperature control system of claim 1 where the valve mechanism is a multi-position valve mechanism.

21. (original) The flowbore fluid temperature control system of claim 1 where the valve mechanism is a single-position valve mechanism.

22. (previously presented) A flowbore fluid temperature control system comprising:

a control system body comprising a flowbore extending through the length of the control system body;

a valve mechanism within the control system body that controls the flow of ~~a~~ flowbore fluid through the flowbore while maintaining the flowbore fluid in the control system body flowbore, the valve mechanism comprising:

a valve sleeve within the flowbore forming an annulus between the outside of the valve sleeve and the inside of the flowbore;

the valve sleeve comprising flow ports allowing fluid flow through the valve sleeve and into the annulus; and

a piston slidingly engaging the inside of the valve sleeve, the position of the piston within the valve sleeve controlling the fluid flow through the flow ports;

an actuator that adjusts the position of the piston within the valve sleeve;

an operating system that operates the actuator and controls the flowbore fluid pressure; and

the temperature of the flowbore fluid being controlled by controlling the pressure drop of the flowbore fluid across the valve mechanism.

23. (original) The flowbore fluid temperature control system of claim 22 further comprising a seal preventing fluid flow across the seal between the outside of the piston and the inside of the valve sleeve.

24. (original) The flowbore fluid temperature control system of claim 22 where the valve sleeve further comprises an outer threaded portion that threadingly engages an inner threaded portion of the flowbore.

25. (original) The flowbore fluid temperature control system of claim 22 where the actuator further comprises a spring within the valve sleeve that interacts with the piston.

26. (original) The flowbore fluid temperature control system of claim 22 where the piston moves in a first direction with an increase in flowbore fluid pressure such that the force of the flowbore fluid pressure causes the piston to compress a spring.

27. (previously presented) The flowbore fluid temperature control system of claim 22 where:

the inside of the valve sleeve further comprises a circumferential groove that reciprocates between multiple first and second positions;

the piston further comprises a ratchet lug extending from the piston that travels within the groove;

the piston moves axially under a first load until the ratchet lug moves to one of the second positions, the ratchet lug rotating the piston as the ratchet lug travels to the second position one of the second positions;

the piston moves axially under a second load until the ratchet lug moves to one of the first positions, the ratchet lug rotating the piston as the ratchet lug travels to one of the first positions;

the piston selectively moves between the first and second positions as the piston rotates within the valve sleeve; and

the position of the piston in the first and second positions allowing varying flow rates through the valve sleeve.

28. (original) The flowbore fluid temperature control system of claim 27 where flowbore fluid pressure provides the first load.

29. (previously presented) The flowbore fluid temperature control system of claim 27 where a spring that is compressed as the piston moves to the second positions provides the second load.

30. (previously presented) The flowbore fluid temperature control system of claim 27 where, once the piston is in one of the second positions, the valve mechanism maintains a selected fluid flow rate with an increase in the flowbore fluid pressure.

31. (original) The flowbore fluid temperature control system of claim 27 where a lock ring locks the piston in a selected second position.

32. (original) The flowbore fluid temperature control system of claim 22 where the operating system further comprises a fluid pump for controlling the fluid pressure within the flowbore.

33. (original) The flowbore fluid temperature control system of claim 22 where the operating system operates the actuator mechanism to selectively control the amount of fluid flow through the valve mechanism.

34. (canceled)

35. (canceled)

36. (canceled)

37. (original) The flowbore fluid temperature control system of claim 22 where the actuator is selected from the group consisting of a mechanical actuator, an electrical actuator, and a hydraulic actuator.

38. (original) The flowbore fluid temperature control system of claim 22 were the operating system is selected from the group consisting of a mechanical system, a hydraulic system, an electrical system, and an acoustic system.

39. (original) The flowbore fluid temperature control system of claim 22 where the valve mechanism is a multi-position valve mechanism.

40. (canceled)

41. (previously presented) A method of controlling the temperature of a flowbore fluid comprising:

flowing flowbore fluid through a control system body having a flowbore therethrough;

selectively adjusting a valve mechanism in the flowbore with an actuator;

maintaining the flowbore fluid in the control system body flowbore as the fluid flows through the valve mechanism;

operating the actuator with an operating system; and

controlling the temperature of the flowbore fluid by controlling the pressure drop across the valve mechanism.

42. (original) The method of claim 41 where operating the actuator further comprises selectively adjusting the fluid pressure in the flowbore.

43. (currently amended) The method of claim 41 ~~further comprising controlling the temperature of the flowbore fluid by controlling the pressure drop of the flowbore fluid across the~~ where the valve mechanism comprises a multi-position valve sleeve.

44. (previously presented) The method of claim 41 where selectively adjusting the valve mechanism comprises selectively positioning a piston within a valve sleeve to allow flowbore fluid to flow through selective ports in the valve sleeve.

45. (previously presented) The method of claim 44 further comprising interacting the piston with a spring.

46. (original) The method of claim 44 further comprising:

increasing the fluid flow through the valve sleeve by selectively increasing the flowbore fluid pressure to move the piston in a first direction in the valve sleeve, the piston opening flow ports in the valve sleeve and compressing a spring as the piston moves in the first direction; and

decreasing the fluid flow through the valve sleeve by selectively decreasing the flowbore fluid pressure to allow the spring to move the piston in a second direction in the valve sleeve, the piston closing flow ports in the valve sleeve as the piston moves in the second direction.

47. (previously presented) The method of claim 45 further comprising:

placing a ratchet lug extending from the piston within a circumferential groove on the inside of the valve sleeve, the groove reciprocating between multiple first and second positions around the inside of the valve sleeve; and

controlling the position of the piston by applying axial forces on the piston to move the lug within the groove, the movement of the lug causing the piston to move axially between the first and second positions as the piston rotates.

48. (original) The method of claim 47 further comprising applying axial forces on the piston to move the piston to a selected position, the position of the piston allowing a selected flow rate through the valve sleeve.

49. (original) The method of claim 48 comprising maintaining a selected flow rate through the valve sleeve and increasing the temperature of the flowbore fluid by increasing the fluid pressure of the flowbore fluid entering the valve sleeve.

50. (original) The method of claim 47 where the axial forces are caused by the fluid pressure in the flowbore in a first direction and the spring in a second direction.

51. (previously presented) A method of controlling the temperature of a flowbore fluid comprising:

flowing the flowbore fluid through a control system body having a flowbore therethrough;

flowing the flowbore fluid through a valve sleeve having ports;

maintaining the flowbore fluid in the control system body flowbore as the fluid flows through the valve sleeve;

controlling the flow of the flowbore fluid through the flowbore by selectively positioning a piston within the valve sleeve to allow flowbore fluid to flow through selective ports in the valve sleeve;

controlling the temperature of the flowbore fluid by controlling the pressure drop of the flowbore fluid across the valve sleeve.

52. (original) The method of claim 51 where selectively positioning the piston within the sleeve valve further comprises operating an actuator by selectively adjusting the fluid pressure in the flowbore.

53. (original) The method of claim 51 further comprising interacting the piston with a spring.

54. (original) The method of claim 51 further comprising:

increasing the fluid flow through the valve sleeve by selectively increasing the flowbore fluid pressure to move the piston in a first direction in the valve sleeve, the

piston opening flow ports in the valve sleeve and compressing a spring as the piston moves in the first direction; and

decreasing the fluid flow through the valve sleeve by selectively decreasing the flowbore fluid pressure to allow the spring to move the piston in a second direction in the valve sleeve, the piston closing flow ports in the valve sleeve as the piston moves in the second direction.

55. (previously presented) The method of claim 53 further comprising:

placing a ratchet lug extending from the piston within a circumferential groove on the inside of the valve sleeve, the groove reciprocating between multiple first and second positions around the inside of the valve sleeve; and

positioning the piston by applying axial forces on the piston to move the lug within the groove, the movement of the lug causing the piston to move axially between the first and second positions as the piston rotates.

56. (original) The method of claim 55 further comprising applying axial forces on the piston to position the piston, the position of the piston allowing a selected flow rate through the valve sleeve.

57. (original) The method of claim 56 where the axial forces are caused by the fluid pressure in the flowbore in a first direction and the spring in a second direction.

58. (withdrawn) A method of controlling the fracture gradient of a formation comprising:

flowing flowbore fluid through a control system body having a flowbore therethrough;

flowing flowbore fluid through a valve mechanism in the flowbore while maintaining the flowbore fluid in the control system body;

adjusting the valve mechanism with an actuator;

operating the actuator with an operating system;

controlling the temperature of the flowbore fluid by controlling the pressure drop across the valve mechanism; and

controlling the fracture gradient of the formation by flowing the flowbore fluid from the control system body proximate to the formation.

59. (withdrawn) A method of drilling a well comprising:

drilling the well using a drill bit attached to a drill string;

flowing flowbore fluid through the drill string having a flowbore therethrough;

flowing flowbore fluid through a valve mechanism in the flowbore while maintaining the flowbore fluid in the drill string;

adjusting the valve mechanism with an actuator;

operating the actuator with an operating system;

controlling the temperature of the flowbore fluid by controlling the pressure drop across the valve mechanism; and

controlling the fracture gradient of the formation by flowing the flowbore fluid from the control system body proximate to the formation.

REMARKS

Claims 1-33, 37-39, and 41-57 remain in this application. Claims 34-36 and 40 have been canceled. Claims 58 and 59 have been withdrawn.

The examiner states that claims 5, 8-12, 24, 27-31, 47-50, and 55-57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

I. ALLOWABLE SUBJECT MATTER

The examiner states that claims 5, 8-12, 24, 27-31, 47-50, and 55-57 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The applicants respectfully submit that base claims 1, 22, 41, and 51 are in condition for allowance as discussed above. Therefore, the applicants respectfully request that the examiner remove the objections to claims 5, 8-12, 24, 27-31, 47-50, and 55-57.

II. FINALITY STATUS OF THIS ACTION

In the applicants' previous reply to the first Office action, the applicants entered amendments and remarks believed to place the claims in condition for allowance based on the art of record. The examiner even admits that the previous amendments and remarks were persuasive and withdrew the rejections. However, now, upon art not previously of record, the examiner enters a "self-admitted" new grounds for rejection and makes this Action final.

As such, a second or any subsequent action on the merits should not be made final if it includes a rejection, on prior art not of record, of any claim amended to include limitations which should reasonably have been expected to be claimed.[1] While the rules no longer give an applicant the right to "amend as often as the examiner presents new references or reasons for rejection," hasty and ill-considered final rejections are not appropriate. The applicants are seeking claims that will give them the patent protection to which they are justly entitled and should not be prematurely cut off in the prosecution of the application. The claim amendments and remarks made in the previous reply were not so substantive as to not have been reasonably expected. The applicants did not add any new elements, but merely more

[1] MPEP § 706.07(a).

clearly defined the elements previously submitted in the claims. The applicants submit that they are entitled to a full and fair hearing and thus respectfully request that the examiner withdraw the finality status of the Office action.

III. CLAIM OBJECTIONS

The examiner objected to claim 43 alleging that the recitation of "the valve sleeve" lacks proper antecedent basis. The applicants amend claim 43 to introduce a multi-position valve sleeve submit that the claim amendment satisfies the examiner's objections. The applicants therefore respectfully request that the examiner withdraw the objection to claim 43.

IV. CLAIM REJECTIONS – 35 U.S.C. §102

A. The Examiner's Statements

The examiner rejected claims 1-4, 6, 7, 13-26, 32-33, 37-39, 41-46, and 51-54 under 35 U.S.C. §102(b) as being anticipated by Bishoff (U.S. Patent No. 5,215,444).

B. The Law

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.[2] The identical invention must be shown in as complete detail as is contained in the ... claim.[3] In addition to disclosing every claim limitation, an anticipatory prior art reference must enable the practice of the invention and describe it sufficiently to have placed it in the possession of a person of ordinary skill in the field of the invention.[4]

C. Rejection of Claims 1-4, 6, 7, 13-26, 32-33, 37-39, 41-46, and 51-54

Claims 1-4, 6, 7, 13-26, 32-33, 37-39, 41-46, and 51-54 are not anticipated by Bishoff because Bishoff does not disclose a valve mechanism that controls the flow through a flowbore that extends through the length of the control system body while maintaining the flowbore fluid in the flowbore. The examiner states that Bishoff teaches flowbores "throughout" the control system body. Bishoff does disclose using multiple flowbores. However, Bishoff only discloses one flowbore, defined by inlet (40) and outlet (42), that extends "through the length" of the control system body. Contrary to the claim requirements

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[2] *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631, 2 U.S.P.Q.2d 1051, 1053 (Fed. Cir. 1987).

[3] *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

[4] *In re Paulsen*, 30 F.3d 1475, 1478-79 (Fed. Cir. 1994).

though, the Bishoff valve mechanism does not control fluid flow though and maintain the fluid in the flowbore defined by inlet (40) and outlet (42). Thus, Bishoff does not teach a valve mechanism that controls flow through a flowbore that extends through the length of the control system body while maintaining the flowbore fluid in the flowbore that extends through the length of the control system body as required by the claims. The applicants therefore respectfully submit that the rejection is unsupported by the art and request that the examiner withdraw the rejection with respect to the claims.

V. STATEMENT REGARDING CLAIMS

The applicants have argued the allowability of the claims by addressing the comments by the examiner in this paper as well as previously during the prosecution of this application. By doing so, the applicants are in no way limiting their ability to argue additional points of novelty regarding the independent claims or dependent claims at a later date.

CONCLUSION

The applicants respectfully request reconsideration the rejected and objected to claims and that a timely Notice of Allowance be issued in this case. If the examiner feels that a telephone conference would expedite the resolution of this case, he is respectfully requested to contact the undersigned.

In the course of the foregoing discussions, the applicants may have at times referred to claim limitations in shorthand fashion, or may have focused on a particular claim element. This discussion should not be interpreted to mean that the other limitations can be ignored or dismissed. The claims must be viewed as a whole, and each limitation of the claims must be considered when determining the patentability of the claims. There may also be other distinctions between the claims and the prior art that have yet to be raised, but that may be raised in the future.

Unless the applicants have specifically stated that an amendment was made to distinguish the prior art, it was the intent of the amendment to further clarify and better define the claimed invention and the amendment was not for the purpose of patentability. Further, although the applicants may have amended certain claims, the applicants have not abandoned their pursuit of obtaining the allowance of these claims as originally filed and reserve, without prejudice, the right to pursue these claims in the future.

If any fees are inadvertently omitted or if any additional fees are required or have been overpaid, please appropriately charge or credit those fees to Conley Rose, P.C. Deposit Account Number 03-2769 (ref. 1391-46000) of Conley Rose, P.C., Houston, Texas.

Respectfully submitted,

CONLEY ROSE, P.C.

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